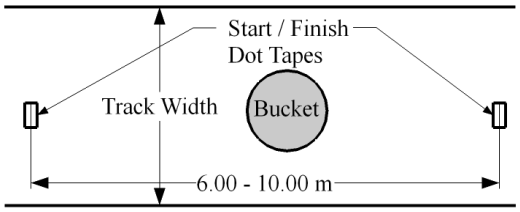
BATTERY BUGGY

1. **DESCRIPTION**: Teams construct a vehicle that uses electrical energy as its means of propulsion, quickly travels a specified distance, and stops as close as possible to the **Finish Dot**.

   A TEAM OF UP TO: 2 **IMPOUND**: Yes **APPROXIMATE TIME**: 15 minutes

2. **CONSTRUCTION PARAMETERS**:
   a. Competitors must design a vehicle to travel a specified distance as quickly as possible. The exact target distance, **straight line, must be 8.00 m for regional, between 6.00 – 10.00 m (1.00 m intervals) for state, and between 6.00 – 10.00 m (0.50 m intervals) for national tournaments. At states and nationals, the distance is** chosen by the Event Supervisor and is not announced until all vehicles have been impounded.
   b. Electrical energy used within the vehicle for any purpose must be stored in commercially available batteries labeled with their voltage by the manufacturer. The vehicle must use no more than 4 individual cells (labeled 1.5 volts or less each) or a single battery pack (labeled 4.8 volts or less) on the vehicle at one time (no more than 4 additional cells or one additional battery pack may be impounded for replacement purposes only). Batteries need not be installed until immediately prior to the run.
   c. Only the same batteries allowed in 2.b. and/or additional non-electric energy storing devices may be used to operate other functions (e.g., braking system) provided these other functions do not help propel the vehicle in any way. All energy sources must be available for inspection by the Event Supervisor.
   d. Components may be purchased or made by the competitors (e.g., motors, gearboxes, bodies, and chassis). **Electric components are limited to batteries, wires, motors, switches, resistors, capacitors, solenoids, and electro-mechanical relays. Any "black boxes" must be easily opened to allow inspection.**
   e. Sighting devices that do not use electricity are allowed (electrical/electronic sighting devices, including lasers are prohibited) and may be removed from the vehicle prior to a run.
   f. The entire vehicle must fit in a **30.0 cm x 30.0 cm space** when in ready to run configuration. **There is no restriction on height of the vehicle.**
   g. Competitors must start the vehicle by actuating a switch using a pen, pencil, dowel, or similar device (which is not part of and does not travel with the vehicle). **The switch must be designed so that the action of starting it is perpendicular (up or down) to the floor. A horizontally activated switch is a construction violation.**
   h. The vehicle must have a fixed, pointed object whose tip is referred to as the **fixed point**. The fixed point must be the on the front of the vehicle and within 1 cm of the track's surface. All distance measurements must use this fixed point.
   i. Only the wheels of the vehicle are allowed to contact the floor.

3. **THE TRACK**:
   a. The track must be on a smooth, level, and hard surface. Space is needed on at least one side of the track's center path and beyond the Dots. **Tournament officials must announce the track width at least a week prior to the tournament.**

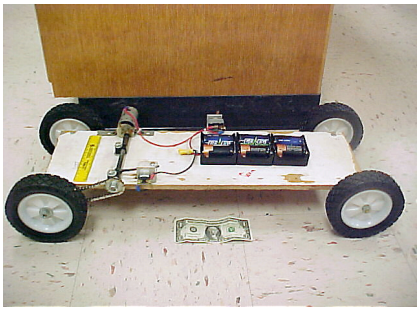


   b. The Start and Finish Dots must be marked on 5 cm long x 1 inch wide pieces of tape. The distance between the Start and Finish Dots must be measured to within 1 mm of the designated target distance.
   c. **Competitors may choose either dot as a Start Dot to accommodate both left or right turning vehicles.**
   d. **A 5-gallon bucket with a bottom diameter between 25.0 and 27.0 cm must be placed on the track, centered on the midpoint between the two Dots. The actual diameter of the bucket must be announced with the track width. There must be no visible line between the Start and Finish Dots.**
   e. More than one track may be used at the Event Supervisor's discretion. Teams will be given the option to choose which track they will use. Both runs by a team must be made on the same track.

4. **THE COMPETITION**:
   a. The vehicle, batteries, and other interchangeable parts must be impounded before the start of the competition. Tools, test data, and measuring/calculating devices need not be impounded. Devices requiring an electrical outlet are prohibited.

b. Only competitors, the Event Supervisor, and officials are allowed in the impound and competition areas while teams are competing. Once teams enter the event area to compete, they must not leave or receive outside assistance, materials, or communication until they are finished competing.
c. Teams have 10 minutes to start up to 2 runs. If the second run has started before the 10-minute period has elapsed, it must be allowed to run to completion. Time used by the Event Supervisor for assessment and measuring must not be included in the 10 minutes.
   i. Teams may adjust their vehicle before each run (e.g., change its speed, distance, directional control, change batteries, or make changes from impounded parts).
   ii. **Teams may ask that the bucket be moved before each run in order to align and aim their vehicle. The bucket must be moved only by the event officials. The bucket must be replaced when directed by the team before the run occurs.**
   iii. Teams may use their own measuring devices to verify the track dimensions. They must not verify the distance by rolling the vehicle on or adjacent to the track surface between the Dots at any time prior to or during the competition.
   iv. Teams must place the fixed point **directly over the Start Dot** and align the vehicle. Competitors may place a target on the track to aid in aligning the vehicle, but it must be removed by the team before starting each run.
   v. While starting the vehicle, competitors must not touch the vehicle.
   vi. The entire vehicle, including batteries, must move forward together.
   vii. Vehicles must not move the bucket.
   viii. Competitors must not follow their vehicle down the track. They must wait until called by the Event Supervisor to observe their finish distance and retrieve their vehicle.
d. The **Official Run Time** starts when the vehicle begins forward motion and ends when the vehicle comes to a complete stop. Failure to move upon actuation of the switch must not count as a run, should this happen, the competitors may request to reset their vehicle.
e. If the vehicle travels in the wrong direction or inadvertently begins a run, it must be considered a failed run. A failed run counts as a run with no score.
f. Teams who wish to file an appeal must leave their vehicle with the Event Supervisor.

5. **SCORING**:
   a. Each **Run Score** is the sum of 2 Components: Distance Score and Time Score. LOW SCORE wins.
   b. The **Distance Score** is the distance from the fixed point to the Finish Dot in millimeters. This is a point-to-point measurement.
   c. The **Time Score** is **25** times the Official Run Time **measured in seconds (to 0.01s)** for the vehicle to move from the Start Dot to a complete stop.
   d. The **Final Score** for the event is the run that gives the team the better rank.
   e. Tiers:
      i. Tier 1: Any runs with no violations.
      ii. Tier 2: Any runs with competition violations.
      iii. Tier 3: Any runs with construction violations or both competition and construction violations.
   f. Ties are broken by the vehicle with the better non-scored run.
   g. Teams whose vehicle cannot complete a run within the allotted 10 minutes or those who have 2 failed runs will be given participation points.



Scoring Example: The vehicle traveled for 8.53 seconds and came to rest 104 mm from the Finish **Dot**.

Time Score	213.25	pts. (8.53 x 25)
Distance Score	104	pts.
Run Score	317.25	pts.

Recommended Resources: All reference and training resources including the **Battery Buggy DVD** are available on the Official Science Olympiad Store or Website at http://www.soinc.org

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